

Claims

1. Subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), including an inter-frequency (IF) measurement means (IFMM) adapted to perform IF measurements, comprising:

a time interval signal detection means (TISDM) adapted to detect in a transmission from said network control means (RNC) an IF measurement time interval indication signal (TIIS) indicating a time interval of an established connection (CC) between said subscriber station (MS) and said base transceiver station (RBS) in which IF measurements are to be carried out by said subscriber station (MS), wherein said IF measurement means (IFMM) is adapted to perform said IF measurements in said time interval indicated in said IF measurement time interval indication signal (TIIS).
2. Subscriber station (MS) according to claim 1, **wherein** said IF measurement means (IFMM) is adapted to carry out said IF measurements over the entire time interval.
3. Subscriber station (MS) according to claim 1, **wherein** said IF measurement means (IFMM) is adapted to start performing said IF measurements in said time interval in response to an IF measurement trigger signal (IFTS).

4. Subscriber station (MS) according to claim 3,
wherein said IF measurement time interval indication signal (TIIS) is contained in said IF measurement trigger signal (IFTS).
5. Subscriber station (MS) according to claim 3 or 4,
wherein said IF measurement trigger signal (IFTS) is generated by an IF handover means (HORM) when said IF handover request means (HORM) determines (NEHO; MEHO) that transmission conditions in said mobile communication system necessitate an IF handover of said subscriber station (MS).
6. Subscriber station (MS) according to claim 3 or 4,
wherein said IF handover means (HORM) is located in a network control means (RNC) of said mobile communication system and is adapted to transmit said IF measurement trigger signal (IFTS) to said subscriber station (MS) via a base transceiver station (RBS) in response to determining a network-evaluated handover (NEHO).
7. Subscriber station (MS) according to claim 3 or 4,
wherein said IF handover means (HORM) is located in said subscriber station (MS) and is adapted to output said IF measurement trigger signal (IFTS) in response to determining a mobile-evaluated handover (MEHO).
8. Subscriber station (MS) according to claim 1,

wherein said subscriber station (MS) comprises a connection quality monitoring means (CQMM) adapted to monitor the quality of service (QoS) on the established communication connection (CC) and to transmit information of the quality of service (QoS) to said network control means (RNC).

9. Subscriber station (MS) according to claim 1, **wherein** during said connection (CC) a delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said subscriber station (MS) comprises a deletion means (DEL) for deleting the data arriving from said base transceiver station (RBS) during said time interval and a power adjustment means (PAM) to increase a transmission power on the up-link (UL) on the communication connection (CC) before the beginning of said time interval and/or after the end of said time interval.
10. Subscriber station (MS) according to claim 1, **wherein** during said connection (CC) a loss-sensitive and/or delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS).
11. Subscriber station (MS) according to claim 1, **wherein** a data transmission between said subscriber station (MS) and said base transceiver station (RBS) is carried out via a transmission of data frames (FR) including a data portion (DP) and a control portion (CP), wherein said data transmission between said

subscriber station (MS) and said base transceiver station (RBS) is carried out in a compressed mode by compression of transmission data in said data portion (DP) in at least one time slot such that an idle time interval is provided in said time slot where no data transmission occurs, wherein said subscriber station (MS) contains a compression-mode determining means (CMDM) for determining data transmission in said compressed mode and wherein said time interval corresponds to a number of data frames indicated in said IF measurement time interval indication signal (TIIS) and a number of idle time intervals of data frames where data transmission is carried in a compressed mode.

12. Subscriber station (MS) according to claim 1 or 11, **wherein** said IF measurement means (IFMM) also carries out measurements in an additional time interval where a data transmission takes place from said base transceiver station (RBS) wherein said subscriber station (MS) contains a deletion means (DEL) for deleting the data which arrives in said additional time interval.
13. Method for performing inter-frequency (IF) measurements (ST21; ST21''; ST21''') in a subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), comprising the steps of selecting (ST211), during a connection (CC) between said subscriber station (MS) and said base transceiver station (RBS), an IF measurement time interval in a network control means (RNC) and sending

(ST211) from said network control means (RNC) to said subscriber station (MS) an IF measurement time interval indication signal (TIIS) indicating said time interval of said connection (CC) in which said IF measurements are to be carried out by said subscriber station (MS); detecting (ST212) said IF measurement time interval indication signal (TIIS) in said subscriber station (MS); and performing (ST212) said IF measurements in said subscriber station (MS) in said time interval of said connection as indicated by said IF measurement time interval indication signal (TIIS).

14. Method according to claim 13,
wherein said IF measurements are carried out over the entire time interval.
15. Method according to claim 13,
wherein said IF measurements are performed (ST13) in response to an IF measurement trigger signal (IFTS).
16. Method according to claim 15,
wherein said IF measurement time interval indication signal (TIIS) is sent (ST13; ST211) in said IF measurement trigger signal (IFTS).
17. Method according to claim 15,
including the steps of determining (ST11) whether transmission conditions in said mobile communication system necessitate an IF handover of said subscriber station (MS) and generating (ST13) said IF measurement trigger signal (IFTS) when it is determined (NEHO; MEHO) that an IF handover is necessary.

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18. Method according to claim 17,
wherein said determining step (ST11) whether transmission conditions in said mobile communication system necessitate an IF handover of said subscriber station (MS) is carried out by an IF handover request means (HORM) located in a network control means (RNC) of said mobile communication system and said IF measurement trigger signal (IFTS) is transmitted (ST13) to said subscriber station (MS) via a base transceiver station (RBS) in response to determining a network-evaluated handover (NEHO).
19. Method according to claim 17,
wherein said determining (ST11) whether transmission conditions in said mobile communication system necessitate an IF handover of said subscriber station (MS) and said generation of said IF measurement trigger signal (IFTS) is carried out by an IF handover request means (HORM) located in said subscriber station (MS) in response to determining a mobile-evaluated handover (MEHO).
20. Method according to claim 13,
wherein in said subscriber station (MS) the quality of service (QoS) on an established communication connection is monitored and information of the quality of service (QoS) is transmitted to said network control means (RNC).
21. Method according to claim 13,
wherein in said base transceiver station (RBS) the quality of service (QoS) on an established

communication connection is monitored and information of the quality of service (QoS) is transmitted to said network control means (RNC).

22. Method for performing inter-frequency (IF) measurements (ST21; ST21''; ST21''') in a subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), comprising the steps of selecting (ST211), during a connection (CC) between said subscriber station (MS) and said base transceiver station (RBS), an IF measurement time interval in a network control means (RNC) and sending (ST211) from said network control means (RNC) to said subscriber station (MS) an IF measurement time interval indication signal (TIIS) indicating said time interval of said connection (CC) in which said IF measurements are to be carried out by said subscriber station (MS); detecting (ST212) said IF measurement time interval indication signal (TIIS) in said subscriber station (MS); and performing (ST212) said IF measurements in said subscriber station (MS) in said time interval of said connection as indicated by said IF measurement time interval indication signal (TIIS); and

wherein in said subscriber station (MS) the quality of service (QoS) on an established communication connection is monitored and information of the quality of service (QoS) is transmitted to said network control means (RNC); and

wherein said time interval of said communication connection is selected on the basis of said information on the quality of service (QoS), wherein

23. Method according to claim 20 or 21,
wherein said time interval of said communication connection is selected on the basis of said information on the quality of service (QoS), wherein said time interval is selected to be a time interval in which a temporary reduction of the quality of service due to said IF measurement means (IFMM) performing said IF measurements is allowed.

24. Method according to claim 13,
wherein during said connection a delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein data arriving from said base transceiver station (RBS) during said time interval is deleted and a transmission power on the down-link (DL) and the up-link (UL) on the communication connection before the beginning of said time interval and/or after the end of said time interval is increased.
25. Method according to claim 13,
wherein during said connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said transmission data before it is sent on the down-link of said communication connection is temporarily stored in a transmission buffer means (BUF) having a predetermined size in said network control means (RNC), wherein in said time interval in which said IF measurements are carried out by said IF measurement means (IFMM), said transmission buffer (BUF) temporarily stores at least a portion of said transmission data to be sent during said time interval and said network control means (RNC) sends said stored data to the subscriber station (MS) after said time interval has ended.
26. Method according to claim 13,
wherein during said connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said network control means (RNC)

27. Method according to claim 26,
wherein if in the time interval the data amount to be transmitted is larger than the predetermined size of said buffer means (BUF), the network control means (RNC) performs a re-scheduling with other buffer means (BUF') to provide an increased storage capacity for the intermediate storage of transmission data.

28. Method according to claim 26,
wherein if in the time interval the data amount to be transmitted is larger than the predetermined size of the buffer means (BUF), said network control means (RNC) is adapted to perform a dynamic buffer scheduling with other buffer means (BUF') in order to increase the buffer size of said buffer means (BUF) and decrease the buffer size of said other buffers means (BUF') in the time interval.

29. Method according to claim 26,
wherein if in the time interval the data amount to be transmitted is larger than the predetermined size of said buffer means (BUF), a deletion means of said

network control means (RNC) deletes at least a portion of the data to be transmitted in said time interval.

30. Method according to claim 29,

wherein said IF handover request means (HORM) comprises a transmission ratio determining means (TRDM) adapted to determine the ratio between transmitted and received data frames (FR) and the measurement time, said IF handover request means (HORM) outputs said IF measurement trigger signal (IFTS) when said transmission/reception ratio is lower than a predetermined ratio.

31. Method according to claim 13,

wherein a data transmission between said base transceiver stations (RBS) and said subscriber station (MS) is carried out by transmitting data frames (FR) including a control portion (CP) and a data portion (DP), wherein in a compressed mode of operation data in said data portion (DP) in at least one time slot of a data frame is compressed (ST21') in said network control means (RNC) such that an idle time interval (IT) is provided in said time slot where no data transmission occurs, wherein a data transmission in said compressed mode is detected (ST21'') in said subscriber station (MS) and wherein said time interval corresponds to a number of data frames indicated in said IF measurement time interval indication signal (TIIS) as well as a number of idle time intervals (IT) of data frames where data transmission is carried in a compressed mode (ST21''').

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32. Method according to claim 13 or 26,
wherein said IF measurements are also carried out in an additional time interval where a data transmission takes place from said base transceiver station (RBS) wherein the data which arrives in said additional time interval from said network control means (RNC) is discarded in said subscriber station (MS).
33. Mobile communication system (GSM; WCDMA) including at least one subscriber station (MS) including an inter-frequency (IF) measurement means (IFMM) adapted to perform IF measurements and at least one base transceiver station (RBS) and a network control means (RNC) for performing data transmissions with said subscriber station (MS) during a connection, comprising said network control means (RNC) comprising an IF measurement time interval selecting means (TISM) adapted to select a time interval of said connection in which said subscriber station (MS) is to carry out IF measurements and adapted to send to said subscriber station (MS) an IF measurement time interval indication signal (TIIS) indicating said time interval; and said subscriber station (MS) comprising a time interval signal detection means (TISDM) adapted to detect in a transmission from said network control means (RNC) said IF measurement time interval indication signal (TIIS) indicating said time interval, wherein said IF measurement means (IFMM) is adapted to perform said IF measurements in said time interval indicated in said detected IF measurement time interval indication signal (TIIS).

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34. System according to claim 33,
wherein said IF measurement means (IFMM) is adapted to carry out said IF measurements over the entire time interval.
35. System according to claim 34,
wherein said IF measurement means (IFMM) is adapted to perform said IF measurements in response to an IF measurement trigger signal (IFTS).
36. System according to claim 33,
further including an IF handover request means (HORM) adapted to determine whether transmission conditions in said mobile communication system necessitate an IF handover of said subscriber station (MS) and to generate said IF measurement trigger signal (IFTS) when it is determined (NEHO; MEHO) that an IF handover is necessary.
37. System according to claim 36,
wherein said IF handover request means (HORM) is located in said subscriber station (MS) and said IF measurement trigger signal (IFTS) is generated in response to determining a mobile-evaluated handover (MEHO).
38. System according to claim 33,
wherein said subscriber station (MS) comprises a connection quality monitoring means (CQMM) adapted to monitor the quality of service (QoS) on the established communication connection and to transmit information of the quality of service (QoS) to said network control means (RNC).

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39. System according to claim 33,
wherein said base transceiver station (RBS) comprises a connection quality monitoring means (CQMM) adapted to monitor the quality of service (QoS) on the established communication connection and to transmit information of the quality of service (QoS) to said network control means (RNC).
40. System according to claim 38 or 39,
wherein said IF measurement time interval selecting means (TISM) selects said time interval of said communication connection on the basis of said information on the quality of service (QoS), wherein said time interval is selected to be a time interval in which a temporary reduction of the quality of service due to said IF measurement means (IFMM) performing said IF measurements is allowed.
41. System according to claim 40,
wherein during said communication connection a delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said subscriber station MS) comprises a deletion means (DEL) for deleting the data arriving from said base transceiver station (RBS) during said time interval and said network control means (RNC) and said subscriber station (MS) each comprise a power adjustment means (PAM) to respectively increase a transmission power on the down-link (DL) and the up-link (UL) on the communication connection before the beginning of said

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time interval and/or after the end of said time interval.

42. System according to claim 33,
wherein said loss-sensitive data transmission is a data transmission during a web-browsing.
43. System according to claim 33,
wherein a data transmission between said base transceiver stations (RBS) and said subscriber station (MS) is carried out by transmitting data frames (FR) including a control portion (CP) and a data portion (DP), wherein said network control means (RNC) comprises a compressed mode operation means (CMOM) adapted to compress in a compressed mode of operation data in said data portion (DP) in at least one time slot of a data frame such that an idle time interval (IT) is provided in said time slot where no data transmission occurs, wherein said subscriber station (MS) comprises a compressed mode determining means (CMDM) for determining a data transmission in said compressed mode and wherein said time interval corresponds to a number of data frames indicated in said IF measurement time interval indication signal (TIIS) as well as a number of idle time portions of data frames where data transmission is carried in a compressed mode.
44. Network control means (RNC) of a mobile communication system for controlling data transmissions between at least subscriber station (MS) and at least one base transceiver station (RBS) on an established connection, comprising:

said network control means (RNC) comprising an IF measurement time interval selecting means (TISM) adapted to select a time interval of a connection in which said subscriber station (MS) is to carry out IF measurements and adapted to send to said subscriber station (MS) an IF measurement time interval indication signal (TIIS) indicating said time interval.

45. Network control means (RNC) according to claim 44, **wherein** said network control means (RNC) sends said IF measurement time interval indication signal (TIIS) together with an IF measurement trigger signal (IFTS) from said IF measurement time interval selecting means (TISM).

46. Network control means (RNC) according to claim 45, including:

an IF handover request means (HORM) adapted to determine whether transmission conditions in said mobile communication system necessitate an IF handover of said subscriber station (MS) and to generate said IF measurement trigger signal (IFTS) when it is determined (NEHO; MEHO) that an IF handover is necessary.

47. Network control means (RNC) according to claim 44, **wherein** said IF measurement time interval selecting means (TISM) selects said time interval of said communication connection on the basis of an information on the quality of service (QoS), wherein

48. Network control means (RNC) according to claim 46, **wherein** during said communication connection a delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said network control means (RNC) comprises a power adjustment means (PAM) to respectively increase a transmission power on the down-link (DL) on the communication connection before the beginning of said time interval and/or after the end of said time interval.

49. Network control means (RNC) according to claim 47, **wherein** during a communication connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said network control means (RNC) comprises a transmission buffer means (BUF) of a predetermined size for intermediate storage of said transmission data before it is sent on the down-link of said communication connection, wherein in said time interval in which said IF measurements are carried out by said IF measurement means (IFMM), said transmission buffer (BUF) temporarily stores at least a portion of said transmission data to be sent during said time interval and said network control means (RNC) sends said stored data to the subscriber station (MS) after said time interval has ended.

50. Network control means (RNC) according to claim 47 or 49,

wherein during a communication connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said network control means (RNC) comprises a transmission buffer means (BUF) of a predetermined size for intermediate storage of said transmission data before it is sent on the down-link (DL) of said communication connection, wherein in said time interval in which said IF measurements are carried out by said IF measurement means (IFMM), said network control means (RNC) decreases the data transmission rate and increases the data transmission rate again after said time interval has ended.

51. Network control means (RNC) according to claim 49, **wherein**, if in the time interval the data amount to be transmitted is larger than the predetermined size of said buffer means (BUF), the network control means (RNC) is adapted to perform a re-scheduling with other buffer means (BUF') to provide an increased storage capacity for the intermediate storage of transmission data.

52. Network control means (RNC) according to claim 49, **wherein**, if in the time interval the data amount to be transmitted is larger than the predetermined size of the buffer means (BUF), said network control means (RNC) is adapted to perform a dynamic buffer scheduling with other buffer means (BUF') in order to increase the buffer size of said buffer means (BUF)

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and decrease the buffer size of said other buffers means (BUF') in the time interval.

53. Network control means (RNC) according to claim 49, **wherein**, if in the time interval the data amount to be transmitted is larger than the predetermined size of said buffer means (BUF), a deletion means of said network control means (RNC) deletes at least a portion of the data to be transmitted in said time interval.
54. Network control means (RNC) according to claim 46, **wherein** said IF handover request means (HORM) comprises a transmission ratio determining means (TRDM) adapted to determine the ratio between transmitted and received data frames (FR) and the measurement time, said IF handover request means (HORM) outputs said IF measurement trigger signal (IFTS) when said transmission/reception ratio is lower than a predetermined ratio.
55. A mobile communication system comprising at least one base transceiver station (RBS), a network control means (RNC) according to one or more of claims 44 - 54 and at least one subscriber station (MS) according to one or more of claims 1-12.
56. Subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), including an inter-frequency (IF) measurement means (IFMM) adapted to perform IF measurements, comprising:

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a time interval signal detection means (TISDM) adapted to detect in a transmission from said network control means (RNC) an IF measurement time interval indication signal (TIIS) indicating a time interval of an established connection (CC) between said subscriber station (MS) and said base transceiver station (RBS) in which IF measurements are to be carried out by said subscriber station (MS), wherein said IF measurement means (IFMM) is adapted to perform said IF measurements in said time interval indicated in said IF measurement time interval indication signal (TIIS); and wherein during said connection (CC) a delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said subscriber station (MS) comprises a deletion means (DEL) for deleting the data arriving from said base transceiver station (RBS) during said time interval and a power adjustment means (PAM) to increase a transmission power on the up-link (UL) on the communication connection (CC) before the beginning of said time interval and/or after the end of said time interval.

57. Method for performing inter-frequency (IF) measurements (ST21; ST21''; ST21''') in a subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), comprising the steps of selecting (ST211), during a connection (CC) between said subscriber station (MS) and said base transceiver station (RBS), an IF measurement time interval in a network control means (RNC) and sending (ST211) from said network control means (RNC) to said

wherein during said connection a delay-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein data arriving from said base transceiver station (RBS) during said time interval is deleted and a transmission power on the down-link (DL) and the up-link (UL) on the communication connection before the beginning of said time interval and/or after the end of said time interval is increased.

58. Method for performing inter-frequency (IF) measurements (ST21; ST21''; ST21''') in a subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), comprising the steps of selecting (ST211), during a connection (CC) between said subscriber station (MS) and said base transceiver station (RBS), an IF measurement time interval in a network control means (RNC) and sending (ST211) from said network control means (RNC) to said subscriber station (MS) an IF measurement time interval indication signal (TIIS) indicating said time

interval of said connection (CC) in which said IF measurements are to be carried out by said subscriber station (MS); detecting (ST212) said IF measurement time interval indication signal (TIIS) in said subscriber station (MS); and performing (ST212) said IF measurements in said subscriber station (MS) in said time interval of said connection as indicated by said IF measurement time interval indication signal (TIIS); and

wherein during said connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said transmission data before it is sent on the down-link of said communication connection is temporarily stored in a transmission buffer means (BUF) having a predetermined size in said network control means (RNC), wherein in said time interval in which said IF measurements are carried out by said IF measurement means (IFMM), said transmission buffer (BUF) temporarily stores at least a portion of said transmission data to be sent during said time interval and said network control means (RNC) sends said stored data to the subscriber station (MS) after said time interval has ended.

59. Method for performing inter-frequency (IF) measurements (ST21; ST21''; ST21''') in a subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), comprising the steps of selecting (ST211), during a connection (CC) between said subscriber station (MS) and said base transceiver station (RBS), an IF measurement time

interval in a network control means (RNC) and sending (ST211) from said network control means (RNC) to said subscriber station (MS) an IF measurement time interval indication signal (TIIS) indicating said time interval of said connection (CC) in which said IF measurements are to be carried out by said subscriber station (MS); detecting (ST212) said IF measurement time interval indication signal (TIIS) in said subscriber station (MS); and performing (ST212) said IF measurements in said subscriber station (MS) in said time interval of said connection as indicated by said IF measurement time interval indication signal (TIIS); and

wherein during said connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said network control means (RNC) comprises a transmission buffer means (BUF) of a predetermined size for intermediate storage of said transmission data before it is sent on the down-link (DL) of said communication connection, wherein in said time interval in which said IF measurements are carried out by said IF measurement means (IFMM), said network control means (RNC) decreases the data transmission rate and increases the data transmission rate again after said time interval has ended.

60. Method for performing inter-frequency (IF) measurements (ST21; ST21''; ST21''') in a subscriber station (MS) of a mobile communication system (GSM; WCDMA) having at least one base transceiver station (RBS) and a network control means (RNC), comprising the steps of selecting (ST211), during a connection

wherein during said connection a loss-sensitive data transmission is performed between said base transceiver station (RBS) and said subscriber station (MS), wherein said network control means (RNC) comprises a transmission buffer means (BUF) of a predetermined size for intermediate storage of said transmission data before it is sent on the down-link (DL) of said communication connection, wherein in said time interval in which said IF measurements are carried out by said IF measurement means (IFMM), said network control means (RNC) decreases the data transmission rate and increases the data transmission rate again after said time interval has ended; and **wherein** if in the time interval the data amount to be transmitted is larger than the predetermined size of said buffer means (BUF), a deletion means of said network control means (RNC) deletes at least a portion

of the data to be transmitted in said time interval;
and

wherein said IF handover request means (HORM) comprises a transmission ratio determining means (TRDM) adapted to determine the ratio between transmitted and received data frames (FR) and the measurement time, said IF handover request means (HORM) outputs said IF measurement trigger signal (IFTS) when said transmission/reception ratio is lower than a predetermined ratio.

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